Department of Toxic Substances Control

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MCAS EL TORO
SSIC NO. 5090.3.A

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August 17, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
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DRAFT FINAL PHASE II FOCUSED FEASIBILITY STUDY, OPERABLE UNIT (OU) 3, INSTALLATION RESTORATION PROGRAM (IRP) SITE 16, CRASH CREW TRAINING PIT NO. 2, MARINE CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the above report dated June 2001, and received by this office on June 19, 2001. The draft final report documents the Phase II Focused Feasibility Study (FS) conducted for IRP Site 16, Crash Crew Training Pit No. 2. Site 16 is located in the northwest quadrant of the station, in the center of the airfield near the intersection of Runways 34-16 and 25-07. The site consists of three unlined pits formerly used for crash crew (firefighter) training.

After review of the document, DTSC has the following comments:

1. Section 4.2.2.2, Compliance with ARARs [Applicable or Relevant and Appropriate Requirements]: "Alternative 2 is expected to ultimately meet the remediation goals of groundwater."

   The discussion for Alternative 2, Long-Term Groundwater Monitoring with Deed Restrictions, in Section 3.2.2 states that modeling results predict that the trichloroethene (also referenced as trichloroethylene or TCE) plume may migrate up to 1,300 feet downgradient from its current position. The following Remedial Action Objectives [RAOs] are identified for Site 16 in Section 2.1.4:

   - "Prevent domestic use of the shallow groundwater unit beneath Site 16 containing VOCs above MCLs [maximum contaminant levels].

- Prevent further migration of VOC-contaminated groundwater from the source area.

- Remove, to the extent feasible, VOCs above MCLs dissolved in the shallow groundwater unit beneath Site 16."

Alternative 2 does not prevent further migration of VOC-contaminated groundwater from the source area and will not satisfy the second RAO.

2. Table 5-1, Comparative Analysis of Remedial Alternatives for Groundwater at Site 16: As part of the Criteria for "Long-Term Effectiveness and Permanence," the "Magnitude of Residual Risk From Groundwater" was evaluated.

   This evaluation should include the incremental cancer risk (carcinogenic effects) and hazard index (non-carcinogenic effects) associated with the site for multiple media and applicable exposure pathways after the remedial action is complete.

3. Appendix A, Applicable or Relevant and Appropriate Requirements: In general, references to the California Code of Regulations can be abbreviated as in the following example, Title 22, California Code of Regulations, Section 66261.24 (22 CCR 66261.24).

4. Appendix A, Table A2-3, Potential Federal Chemical-Specific ARARs by Medium, Groundwater: The requirement for "Definition of a Hazardous Waste" is also potentially applicable for extracted groundwater generated from monitoring activities for Alternative 2.

5. Appendix A, Table A2-4, Potential State Chemical-Specific ARARs by Medium, Groundwater, Surface Water, Soil, and Air: The requirement for "Definition of a 'non-RCRA [Resource Conservation and Recovery Act] hazardous waste'" is also applicable to groundwater generated from monitoring activities for Alternative 2.

6. Appendix A, Section A4.2.1, Deed Restrictions: The second sentence in the second paragraph states, "State statutes that have been accepted by the DON as potential ARARs for implementing institutional controls and entering into an environmental restriction covenant and agreement with DTSC include substantive provisions of Cal. Civ. Code [California Civil Code] § 1471 and Cal. Health & Safety Code §§ 25202.5, 25222.1, and 25233(c)."

California Health and Safety Code can be abbreviated as "HSC."

Additionally, please insert "25232(b)(1)(A) through (E)" before "and 25233(c)."

7. Appendix A, Section A4.2.1, Deed Restrictions: The fourth paragraph begins, "The substantive provisions of Cal. Health & Safety Code § 25202.5 . . ."

   After the fourth paragraph, please insert the following paragraph, "Actual land use restriction requirements are set forth in HSC subparagraphs 25232(b)(1)(A) through (E). These include prohibitions on construction of residences, hospitals for humans, schools for persons under 21 years of age, day care centers, or any permanently occupied human habitation on hazardous waste property. HSC paragraph 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in HSC subparagraphs 25232(b)(1)(A) through (E) based upon specified environmental and health criteria."

8. Appendix A, Section A4.2.1, Deed Restrictions: The fourth sentence in the fifth paragraph states, "The DON will comply with the substantive requirements of Cal. Health & Safety Code § 25222.1 by incorporating CERCLA use restrictions, which are also consistent with the substantive requirements of Cal. Health & Safety Code § 25233(c), into the Don's deed of conveyance in the form of restrictive convenants under the authority of Cal. Civ. Code § 1471."

   Please insert "subparagraphs 25232(b)(1)(A) through (E)" before "§ 25233(c)."

9. Appendix A, Section A4.2.1, Deed Restrictions: The sixth paragraph states, "In addition to being implemented through the environmental restriction covenant and agreement between the DON and DTSC, the appropriate and relevant portions of Cal. Health & Safety Code §§ 25202.5, 25221.1, and 25233 and Cal. Civ. Code § 1471 shall also be implemented through the deed between the DON and the transferee."

   Please insert "25230, 25232" before "and 25233."

10. Appendix A, Table A4-2, Potential State Action-Specific ARARs: The entry for "Land-use controls" under the HSC include the following citations, HSC 25202.5, 25222.1, and 25233(c).

    Please include HSC subparagraphs 25232(b)(1)(A) through (E) in the list of citations. Additionally, please modify the comments to include a description of these citations.

In addition to the comments provided above, please address the enclosed comments prepared by the DTSC Engineering Services Unit. If you have any questions, please contact me at (714) 484-5395.

Sincerely,

Triss M. Chesney

Triss M. Chesney, P.E.
Remedial Project Manager
Southern California Branch
Office of Military Facilities

Enclosure

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M EMORANDUM

TO: Triss Chesney, P.E., Project Manager
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VIA: Mark Bertwell for

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FROM:

Laszlo Saska, P.E., Hazardous Substances Engineer
Engineering Services Unit - HQ
(916) 323-3283 FAX (916) 323-3700

DATE: July 31, 2001

SUBJECT: *Draft Final Phase II Focused Feasibility Study, OU-3 IRP Site 16, Marine Corps Air Station, El Toro*, by Bechtel National, Inc., dated June 2001

We have reviewed the above draft Focused Feasibility Study (dFFS) by Bechtel National, Inc., on behalf of the Department of the Navy (Navy). We would like to offer the following comments and recommendations for your consideration.

Summary:

We have identified several issues which require resolution before a final version of the document is produced. The issues are: interpretation and use of the results of the rebound testing, calculation of soil gas threshold concentrations, remaining contaminant levels, and estimation of costs of remedial alternatives. These issues are discussed in detail below.

Comments:

1) Section 1.3.4.2, MPE Rebound Testing Rationale, page 1-48: We have previously identified our technical concerns regarding the use of the results of the multiphase extraction system (MPE) rebound testing. We continue to maintain that the results of the rebound testing are not adequate to predict long-term vapor concentrations, and, thus, cannot be used to base the closure of the vadose zone at Site 16.

First, clarification of terms. Normally, soil vapor extraction (SVE) or its enhancement, the MPE, is first operated in a full-scale mode. This mode removes the bulk of the recoverable subsurface contamination. Full-scale operation continues until the influent vapor concentrations decay to very low levels. Then, pulsed operation begins. The pulsed mode is used to reduce operational costs while continuing the extraction of diminished vapors from the subsurface. In this operational mode, either the entire well system, or only selected wells are operated in a time-limited, pulsed basis. Pulsed operation normally continues for several weeks. Because subsurface vapor concentrations always recover or rebound to a certain level following the cessation of vapor extraction activities, long-term monitoring of subsurface vapors must follow the pulsed operation mode to ensure that the vapor rebound does not exceed the cleanup level.

Thus, the brief activity that was just completed at Site 16, we would term a monitored pulsed operation of the MPE system. The Navy calls it rebound testing. Regardless of terminology used, we feel that there is a need for the continued long-term monitoring of subsurface vapors. The Navy, however, feels that its rebound testing, which quickly followed after the full-scale operation, produced reliable data on which to base the Site 16 vadose zone closure decision. We disagree.

The intent of monitoring the vadose zone following a pulsed operation of a SVE or MPE system is to determine the trends in subsurface soil vapor concentrations. The trends, in turn, can then be extrapolated into the long-term future in an attempt to predict future soil vapor concentrations levels, examine whether those predicted levels are acceptable, and thus determine whether vadose zone closure is warranted. Clearly, the longer one allows the soil vapors to equilibrate in the subsurface during monitoring, the more representative those extrapolations will be of the long-term. Thus, the preference is to monitor concentration levels over as long of a time period following after the soil vapor extraction activities as practical and realistic. We cannot consider twenty-eight days as an adequate amount of time from which to predict long-term soil vapor concentration levels, and on which to base vadose zone closure decisions. Soil vapor rebound monitoring should continue over at least a six-month period.

The Navy provided several lines of rationale to state that the 28-day time period is sufficient to conduct a rebound test at Site 16.

The first line of rationale cited is the observed long-term decreasing rate of decline of extracted soil vapor concentration. With possibly a few short-lived exceptions, the trend describing the decay of extracted soil vapor concentration data always exhibits a decreasing rate of decline. This trend is not unique to Site 16 and is an expected trend that is also sometimes called the diminishing rate of return. It is unclear how the cited decreasing rate of decline of soil vapor concentration supports the conclusion that 28-days is sufficient after which to conduct a soil vapor rebound monitoring.

The second line of reasoning noted by the Navy is similar to the first rationale noted above: the contaminant mass extraction exhibits a decreasing rate of decline. As noted by the Navy, this is because the contaminant mass extraction rate is simply the product of the extraction flow rates and the corresponding concentration values. Unless, the extraction flow rate is varied greatly during the extraction activities, the trend of the mass extraction rate would parallel the decay trend exhibited by the vapor concentration levels. Again, the direct relevance to the vapor rebound monitoring remains unclear.

The third line of rationale cited by the Navy is based on the observation that subsurface vacuum levels stabilized within one hour following a change in applied extraction vacuum. This observation is related to the air permeability of the subsurface, not to the rate of diffusion of contaminants from tight soil formations which is the primary cause of vapor concentration rebound. Volatilization from the groundwater is another major cause of vadose zone concentration rebound.

The fourth line of rationale notes that over 72 percent of the total contaminant mass has been recovered by the extraction system to date. The Navy originally predicted the Site 16 total contaminant inventory to be about 60 pounds. After discovering that the extraction system recovered contaminants in excess of that, but with more subsurface contamination clearly remaining, the Navy revised upward its site contaminant inventory to about 100 pounds. The Navy has done that by re-interpreting historical soil sampling data which exhibited concentration levels below detection limits. Re-interpreting historical sampling results to fit currently observed data cannot be accepted as good science and will not produce particularly credible arguments. Estimation of site contaminant inventory is invariably uncertain and seems to produce consistent underestimates. The use of estimated site contaminant inventory should not be used to advance arguments for site closure.

As noted above, the rebound of soil vapor concentration levels can be traced, among other possibilities, to diffusion of residual contaminants from tight formations and volatilization of contaminants from contaminated groundwater. Specific parameters that can govern the trends in vapor rebound are the amounts and thicknesses of low permeability soil lenses, the rate of diffusion of contaminants from those lenses, the amount of contaminants remaining in those low permeability lenses, level and extent of groundwater contamination, etc. While such parameters can be estimated based on subsurface data, only long-term monitoring can begin to indicate what the real rate and magnitude of soil vapor rebound may be in the future.

We recommend that the vapors in the vadose zone at Site 16 be subjected to long-term monitoring over more reasonable and agreed upon time periods (and additional pulsed operations, if needed). Only after the results of the long-term monitoring verify compliance with cleanup levels, can a decision be made about the closure of the Site 16 vadose zone.

2) Section 1.3.5.5, Mass Loading Threshold Estimates, page 1-111:

The dFFS fails to provide adequate supporting information on the estimation of the threshold trichloroethene (TCE) mass loading concentration (estimated to be 83 µg/l). This is a critical parameter to the vadose zone remediation process, and we would like to fully evaluate the mathematical basis of it before we can concur. We would like to see an appendix dedicated to the transport modeling and would like to include printouts of all relevant modeling parameters, such as inputs, outputs, boundary conditions, etc.

In addition, the dFFS used a so-called "modeling factor" to estimate the threshold soil gas concentration values for the other volatile organic compounds (VOCs) at Site 16. Such an approach is troublesome because the soil threshold calculation is based on contaminant-specific properties, such as Henry's law constants, various partitioning coefficients, etc. Therefore, we request that specific threshold level calculations be done for those contaminants whose soil gas threshold values are quite low. These contaminants are benzene and 1,2-dichloroethane.

3) TCE Levels During the Rebound Test: Dynamic TCE concentration levels in well 16MPE1 from 6-April through 11-April-2001 were measured to be consistently above the proposed 32 µg/l threshold level, as shown in Tables 1-8 and 1-13. This is not discussed in the dFFS. Then on 12-April-2001, after the active extraction ceased, the static TCE concentration dropped to 10 µg/l in well 16MPE1, as shown in Table 1-7. We are puzzled at the apparent drop in the concentration of TCE. We would like to evaluate the hypothesis the Navy may have developed to explain such a phenomena, as well as evaluate the Navy's position about well 16MPE1 producing TCE vapors in excess of the Navy's proposed soil vapor threshold value, especially in light of the fact that subsurface soil vapor concentrations are bound to increase with time.

It is also interesting to note that during 4-April-2001 through 11-April-2001 rebound testing period, an additional 2.6 pounds of TCE was removed. This is a significant amount, and one that suggests that a continued pulsed mode of operation may be worthwhile. We recommend that the Navy address this issue.

4) Remedial Cost Estimates: Several problems are evident with the remedial cost estimates presented in Section 4 and Appendix B of the dFFS which subsequently make the presented results difficult to interpret..

The dFFS employed the Remedial Action Cost Engineering and Requirements (RACER) software to develop the remedial cost estimates for the remedial alternatives of Site 16. RACER is an excellent tool to estimate remedial costs. The Department of Toxic Substances Control uses RACER consistently and with good result to estimate remedial costs, and fully endorses its use.

However, it appears that a conceptual error was made in the use of RACER's output: RACER includes a concept called "escalation," which is really a correction for inflation. (RACER, unfortunately, does not allow the user to adjust the internal escalation rate --- an unfortunate drawback of RACER --- and that makes "escalation" not a particularly useful feature in RACER.) The dFFS based its present worth calculations on RACER's "escalated" figures. Unfortunately, since present worth calculations already implicitly include inflation, the dFFS effectively counted inflation twice. This invalidates the present worth figures for Site 16. When using RACER, present worth figures must be based on the "unescalated" (i.e. uninflated) RACER figures.

Also, it is very difficult to verify the accuracy of the present worth figures presented because of the format in which the dFFS presents the cost line items. We suggest that all subtotal cost figures be presented as present worth cost. Thus, there should be present worth subtotals listed for capital, operations and maintenance (O&M), monitoring, etc. categories.

The present worth calculations should be based on a baseline date which generally represents the start date of one or more of the projects. In the case of Site 16, a reasonable baseline year would be January 2002. Furthermore, all cost items, including line item subtotals should be expressed as dollar amounts of that base year. For instance, all capital, O&M, monitoring, etc., cost items should be listed in January 2002 dollars.

Finally, all line items should be expressed as completely marked-up figures, that is as the sum of direct costs and mark-ups (indirect costs). Breaking out the indirect costs as a separate line item, as the dFFS had done in Appendix B, makes it impossible to determine what portions of it are attributable to capital and O&M costs.

A possible format for presenting cost estimates is attached.

Otherwise, we concur with the use of the four percent discount rate (seven percent rate of return minus the three percent inflation) as an appropriate and conservative rate for present worth calculations.

* * *

Should you have any questions, please do not hesitate to contact me at the above number.

Alt 1

Project Name: xxxxxxx
Project ID: xxxxxxx
Site Name: RA 1
Site ID: RA 1
Phase Element Name: RA 1 Mod.
Phase Element Type: RD/RA
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Approach: Ex Situ

Location: LOS ANGELES, CA
Media/Waste Type: Free Product
Secondary Media/Waste Type: Groundwater
Contaminant: Volatile Organic Compounds (VOCs)
Secondary Contaminant: None
Markup Template: System Defaults
Start Date: 1/1/03 (Capital) 1/1/04 (O&M)

Discount rate: 0.05

Phase Element Name	Capital Cost $Y2001	Annual Average O&M * $Y2001	Total O&M $Y2001	O&M Present Worth $Y2001	Project Present Worth $Y2001
RI / FS	$700,000				$700,000
Remedial Design	$183,000				$183,000
Professional Labor Management	$471,000				$471,000
Extraction Wells (10-yrs)	$459,000	$32,000	$320,000	$250,000	$709,000
Carbon Adsorption (Liquid) (10-yrs)	$628,000	$564,000	$5,640,000	$4,350,000	$4,978,000
Carbon Adsorption (Gas) (10-yrs)	$2,000	$14,000	$140,000	$110,000	$112,000
Five-year reviews (100-yrs)		$9,000	$860,000	$540,000	$540,000
Miscellaneous (10-yrs)		$86,000	$860,000	$640,000	$640,000
Filtrate / sludges (sampling) (10-yrs)		$9,000	$90,000	$70,000	$70,000
Ambient air (sampling) (10-yrs)		$2,000	$20,000	$10,000	$10,000
General Monitoring (labor, mgmt.) (10-yrs)		$166,000	$1,660,000	$1,280,000	$1,280,000
RA-1 Mod. Total Project Cost	**$2,443,000**		**$9,590,000**	**$7,250,000**	**$9,695,001**
Annual Average O&M (1-10 Yrs)		**$882,000**			
Annual Average O&M (10-100 Yrs)		**$9,000**			